Prepared for:
Arch Chemicals, Inc
Charleston, Tennessee

Ecological Risk Assessment Work Plan Addendum
350 Knotter Drive
Cheshire, Connecticut

ENSR Corporation
July 2008
Document No.: 00489-014-400a

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Prepared for:
Arch Chemicals, Inc.
Charleston, Tennessee

Ecological Risk Assessment Work Plan Addendum
350 Knotter Drive
Cheshire, Connecticut

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ENSR Corporation
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1.0 Introduction

A Screening Ecological Risk Assessment (SERA) will be conducted for evaluation of potential adverse environmental effects of site-related constituents of potential concern (COPC) on ecological receptors and resources at or near the Arch Chemicals, Inc. ("Arch") facility located in Cheshire, Connecticut (Figure 1). The purpose of the SERA is to provide a conservative evaluation of potential ecological risks posed by site-related COPC, as part of the overall site-wide Resource Conservation and Recovery Act (RCRA) Closure process.

In April 2007 ENSR Corporation (ENSR) prepared an Ecological Risk Assessment Work Plan on behalf of Arch (ENSR, 2007a). Arch received comments on the work plan from the United States Environmental Protection Agency (U.S. EPA) and the Connecticut Department of Environmental Protection (CTDEP) in a letter dated December 5, 2007 (see Attachment 1). These comments were discussed in a preliminary response to comments document submitted to CTDEP on January 21, 2008 (see Attachment 2). These responses were further discussed by ENSR, CTDEP and U.S. EPA in a conference call on March 20, 2008 and consensus was reached on several items. The following bullets summarize the items agreed upon during the conference call:

- ENSR agreed to collect additional surface soil samples from within the operations area, the former drainage ditch area, the bank where the former drainage ditch is most likely to have discharged to the detention basin, and background areas.
- Sediment samples will not be collected from the southern and northern detention basins since they receive stormwater from surrounding properties.
- ENSR agreed to conduct additional historical research on the nature and scope of Siemen's former operations to confirm that the proposed analyses to be conducted are sufficient to address chemicals formerly used at the Site.
- ENSR agreed to conduct additional research into the historic use of propellants for explosives at the Site.
- ENSR agreed to provide CTDEP and U.S. EPA with the Stormwater Management Plan which includes drawings of the catch basin, floor drain, and roof drain systems at the Site. This information will be used to determine whether the collection of a surface water sample from the detention pond is warranted.

As agreed, this document serves as an addendum to the April 2007 *Ecological Risk Assessment Work Plan* (ENSR, 2007a) designed to update the work plan based on the consensus reached during the March 20, 2008 conference call. The remainder of this addendum is organized in the following manner: Additional Site Operations Information (Section 2.0), Proposed Surface Soil Sampling and Evaluation (Section 3.0), and References (Section 4.0).

2.0 Additional Site Operations Information

During the March 20, 2008 conference call, CTDEP and U.S. EPA indicated that additional information was needed regarding the historic operations at the Site, including the possible use of propellants, and stormwater management. The additional information has been researched and the available information is presented in the sub-sections below.

2.1 Former Siemen's Operations

As indicated in the work plan (ENSR, 2007a), the facility at 350 Knotter Drive has been used by Arch/Olin since Olin acquired the facility in 1983. The facility was previously occupied by Siemens, a medical equipment manufacturing company, after its construction in 1975. Prior to 1975, the Site and surrounding area was under agricultural use.

At the time of the work plan, no information was available regarding the specific activities performed by Siemens at the facility. In response to requests from CTDEP and U.S. EPA, additional research on Siemen's former operations was conducted in order to confirm that the analyses conducted are sufficient to address chemicals formerly used at the Site.

ENSR was unable to locate additional information regarding the former use of the Site by Siemens as a medical equipment manufacturing company. Siemen's operated the site from 1975 through 1984 and Arch staff has no knowledge of the previous operations. Based on ENSR's experience, some activities typical of medical equipment manufacturing companies include: metal working, painting, finishing, parts cleaning, and parts assembly. COPCs associated with these activities include volatile and semi-volatile organic compounds (VOCs and SVOCs), metals, and petroleum hydrocarbons. These COPCs were included for analysis during the Transfer Act investigation, and also will be analyzed for when the proposed surface soil samples are collected.

2.2 Former Use of Explosives at the Site

Per CTDEP and U.S. EPA requests, ENSR agreed to conduct additional research into the use of propellants for explosives at the Site. According to Arch personnel, hydroxyl ammonia nitrate (HAN), a liquid propellant, and hydrazine, a rocket fuel, were used in very small quantities (lab quantities) at the facility. Current Arch staff is unaware of the exact process in which these chemicals were used, but stated that it was only lab scale work. Any waste generated would have been collected for off-site disposal with other hazardous waste generated at the facility. Both HAN and hydrazine were used at the facility from approximately 1984 until 2005. Note that the facility has been connected to the sanitary sewer since 1981; therefore, no discharges of explosive to the environment are expected to have occurred.

According to the Agency for Toxic Substances and Disease Registry (ATSDR), hydrazines easily evaporate to the air, where they are broken down by reactions within minutes or hours. When released to water, hydrazines usually break down into less toxic compounds within a few weeks. In soil, hydrazines may stick to particles and be changed within a few days to less harmful compounds (ATSDR, 1999).

According to Arch personnel, HAN does not have any constituents that would persist in the environment. HAN contains hydrogen, nitrogen, and oxygen (chemical formula $H_4N_2O_4$).

All chemical wastes in the main building are collected and temporarily stored in the "waste transfer room" located on the southeastern side of the building. This room has secondary containment consisting of a sealed and sloped concrete floor and separate bermed areas for drums of solvent, basic, and acid wastes.

2.3 Stormwater Management

ENSR agreed to provide CTDEP and U.S. EPA with information regarding stormwater management at the facility. Portions of the November 2000 *Stormwater Pollution Prevention Plan* for the Site are included as Attachment 3. The text of the plan provides a good overview of Site conditions and stormwater drainage areas. Facility personnel were unable to locate the Figures and Appendices for the Plan; however, they were able to provide ENSR with an As-Built Site Plan from 1983 (Attachment 4). The 1983 Site Plan shows the stormwater drainage areas, stormwater flow patterns and topography for the Site. This plan is expected to reflect the current conditions at the Site, with the exception of the southernmost storm drain, which is no longer present.

Approximately 90% of the 75-acre Arch Chemical property is undeveloped landscaped or wooded land. These areas are not used for any manufacturing processes and any rainfall that does not immediately infiltrate during a storm event will accumulate on the land surface or in the wetland areas or detention ponds. Most of the stormwater will eventually evaporate or infiltrate into the ground, while a small amount of stormwater will eventually discharge from the northern detention pond via an intermittent stream across the eastern property boundary.

A portion of the stormwater runoff from the part of the driveway between Knotter Drive and the parking lot is discharged as overland sheet flow to landscaped areas on either side of the driveway because the driveway is not curbed along this length. The remainder of the runoff from this portion of the driveway is collected in five catch basins. These catch basins discharge via a 24-inch reinforced concrete pipe (RCP) to a grassed swale along Knotter Drive, which in turn discharges to a stream that flows into the detention pond in the northwest corner of the property.

The remaining driveways and paved areas surrounding the building to the north, east, and south, as well as the employees/visitor parking area are curbed. Stormwater runoff from the driveways, the loading area, outside drum storage area, the outdoor experimental pools, the dumpsters, and the hazardous waste storage building are directed via the curbing to three catch basins. These three catch basins discharge via a 30-inch RCP to the unnamed stream that flows along the northern edge of the property. This stream receives runoff from the northern detention basin, as well as off-site, upgradient flow from along Knotter Drive, and runoff from the parking lot on the off-site abutting northern property.

Rainwater from the roof of the building is collected by roof drains and discharge to the same 30-inch RCP which collects and discharges stormwater from the driveways to the north, east and south of the building.

Stormwater runoff from the employee/visitor parking area discharges via one of five paved drainage ditches located along the northern edge of the parking lot to the wooded area, in the direction of an unnamed brook located along the northern edge of the property. This area is used for parking only. No raw materials, finished products or waste are stored or transported in this area.

According to ENSR's contact at the Arch facility, Mr. John Lesky, there are no floor drains currently located in the building (aside from in the restrooms). Mr. Lesky has worked at the facility since 1995, and no floor drains have been located at the site since that time. Mr. Lesky was unable to uncover historical drawings of the building drainage prior to 1983, when Arch/Olin acquired the facility.

The 1983 Site Plan depicts a 10-inch storm drain discharging southeast of the building. This storm drain is the "drainage ditch" referred to in the April 2007 SERA Work Plan. Chiller condensate and non-contact cooling water were released as a permitted discharge from approximately 1984 to 1988; first as a CT NPDES permit for discharge to Ten Mile River and later as Minor Non-Contact Cooling Water. ENSR will use the 1983 Site Plan to determine the appropriate placement of the soil samples in the drainage ditch discussed below in Section 3.1.1.

No sampling of surface water in the detention ponds is proposed since the basins receive tributary flow and stormwater from upgradient areas and impervious surfaces. Water quality in the detention ponds will be a

function of the cumulative watershed uses and also reflect localized sources (e.g., overabundant geese populations).

3.0 Proposed Surface Soil Sampling and Evaluation

The existing soil data collected to date were for compliance with the requirements of the Connecticut Transfer Act Site Investigation, Verification and RCRA Clean Closure and not as part of the SERA. Therefore, the use of deeper soils samples may not provide sufficient information to evaluate potential soil conditions in upper layers where ecological receptors are most likely to be present. Therefore, in order to provide a more appropriate data set for the ERA, several surface soils from the 0 to 2 foot horizon will be collected from the Site and background locations.

3.1 Surface Soil Sample Collection

Surface soil samples will be collected using a hand auger from locations within the operations area, the former drainage ditch area, the bank where the former drainage ditch is likely to have discharged to the detention basin, and background areas as indicated in Figure 2. A total of 11 soil samples will be collected from the 0 to 2 foot soil horizon in order to better assess potential impacts to ecological receptors due to exposure to constituents in the surface soil.

3.1.1 Sampling Locations

Figure 2 presents the proposed soil sampling locations. A series of three samples will be collected from the eastern portion of the property in the vicinity of the former leaching field and two underground storage tanks (USTs). Four samples will be collected in the area of the historic drainage ditch which reportedly discharged chiller condensate and non-contact cooling water into the southern detention basin.

As indicated in communications with CTDEP and U.S. EPA (Appendix 2), these historic releases occurred as a permitted discharge licensed to Ten Mile River; first as a CT NPDES permit for discharge to Ten Mile River and later as Minor Non-Contact Cooling Water. CT DEP evaluated the biocides and corrosion inhibitors found in trace amounts in these discharges and determined they did not violate water quality standards.

The ditch has not been used in approximately 15 years and was not readily apparent during a 2007 site visit conducted prior to the SERA work plan development. However, the area between the south of the building and the southern detention pond will be examined in detail for evidence of the former drainage ditch and four samples will be collected in order to assess potential soil impacts due to the historic discharge. In addition, a soil sample will be collected from the bank of the detention pond approximately where the former drainage ditch was most likely to have discharged into the pond (as best can be determined from a visual inspection and from the 1983 Site Plan).

Finally, three background samples will be collected from within the property boundary but outside the operations areas. One sample will be collected from within the wetlands located along the southern property line. One sample will be collected from the open area between the facility building and Knotter Drive and one sample will be collected from the northern property line. The background samples will be used to help assess whether constituents originated from the Site or have a more regional distribution.

3.1.2 Surface Soil Sampling Procedures

Soil samples will be collected from the 0 to 2 foot horizon using stainless steel hand auger or equivalent technology. All soil samples will be placed in a decontaminated 1+ gallon stainless steel bowl. Soil samples will be analyzed for percent solids, metals, total petroleum hydrocarbons (TPH), SVOCs, and VOCs using the methods listed below:

Parameter	Methodology[1]
VOCs	SW-846 Method 8260B
SVOCs	SW-846 Method 8270C
Metals	SW-846 Method 6010B/7471A (Hg)
Percent Solids	SM2540G Mod.
TPH	EPA 418.1
[1] Alternate methods may be proposed by the laboratory in order to achieve the necessary detection limits. These methods will be approved by the Project Quality Assurance Officer prior to use.	

With the exception of VOC analysis, samples will be homogenized prior to placement in analytical sample containers. The sample containers will be pre-labeled by the sampling task manager at the beginning of each day. Field notebooks and sample collection forms will be used to record pertinent data while sampling. The time of sampling will be recorded on each pre-labeled bottle. All samples will be stored on ice (at 4°C), packed in coolers, and shipped under chain of custody for laboratory analysis. Sampling and analysis will be conducted in accordance with the *Quality Assurance Project Plan (QAPP) Property Transfer/RCRA Closure at Arch Chemicals, Inc.* (ENSR, 2007b).

Soil sampling equipment such as bowls, spoons, and augers will be decontaminated prior to and following sample collection. The specific equipment decontamination procedures to be used for any non-disposable or non-dedicated sampling equipment are described below.

- Clean equipment with tap water and a laboratory grade non-phosphate detergent; and,
- Rinse thoroughly with tap water;

Quality control (QC) samples for laboratory analyses will include field duplicates, trip blanks, and temperature blanks. QC sample collection and sampling frequency are described in the QAPP (ENSR, 2007b). No formal validation of the data deliverables will be performed.

3.2 Terrestrial Receptor Risk Evaluation

As indicated in the Ecological Risk Assessment Work Plan (ENSR, 2007a), terrestrial invertebrate and plant communities in the upland portions of the Site may potentially be exposed to COPCs from direct contact with soil. The Ecological Receptor Exposure Pathway Scoping Checklist provided by CTDEP (Attachment 5) will be completed as part of the SERA in order to document potentially relevant ecological exposure pathways at the Site.

The evaluation of the newly collected surface soil data will be conducted in the same way that was previously proposed for the deeper soil borings. To assess potential risks to these receptors, measurement endpoints include evaluation of available analytical chemistry data and comparison to screening benchmarks. Sources for soil screening values will be considered in this order:

- Ecological Soil Screening Levels (Eco-SSLs) developed according to U.S.EPA guidance (U.S. EPA, 2005);
- U.S. EPA Region 4 soil screening levels (U.S. EPA, 2001); and
- U.S. EPA Region 5 Ecological Screening Levels (ESLs) for soil (U.S. EPA, 2003).

These ecological screening values are based on conservative endpoints and sensitive ecological effects data. They represent a preliminary screening of Site contaminant levels to determine if there is a need to conduct further investigations at the Site.

4.0 References

Agency for Toxic Substances and Disease Registry (ATSDR). 1999. Toxicological Profile for Hydrazines. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

ENSR. 2007a. Ecological Risk Assessment Work Plan for Arch Chemicals Inc., 350 Knotter Drive, Cheshire, Connecticut. April 2007.

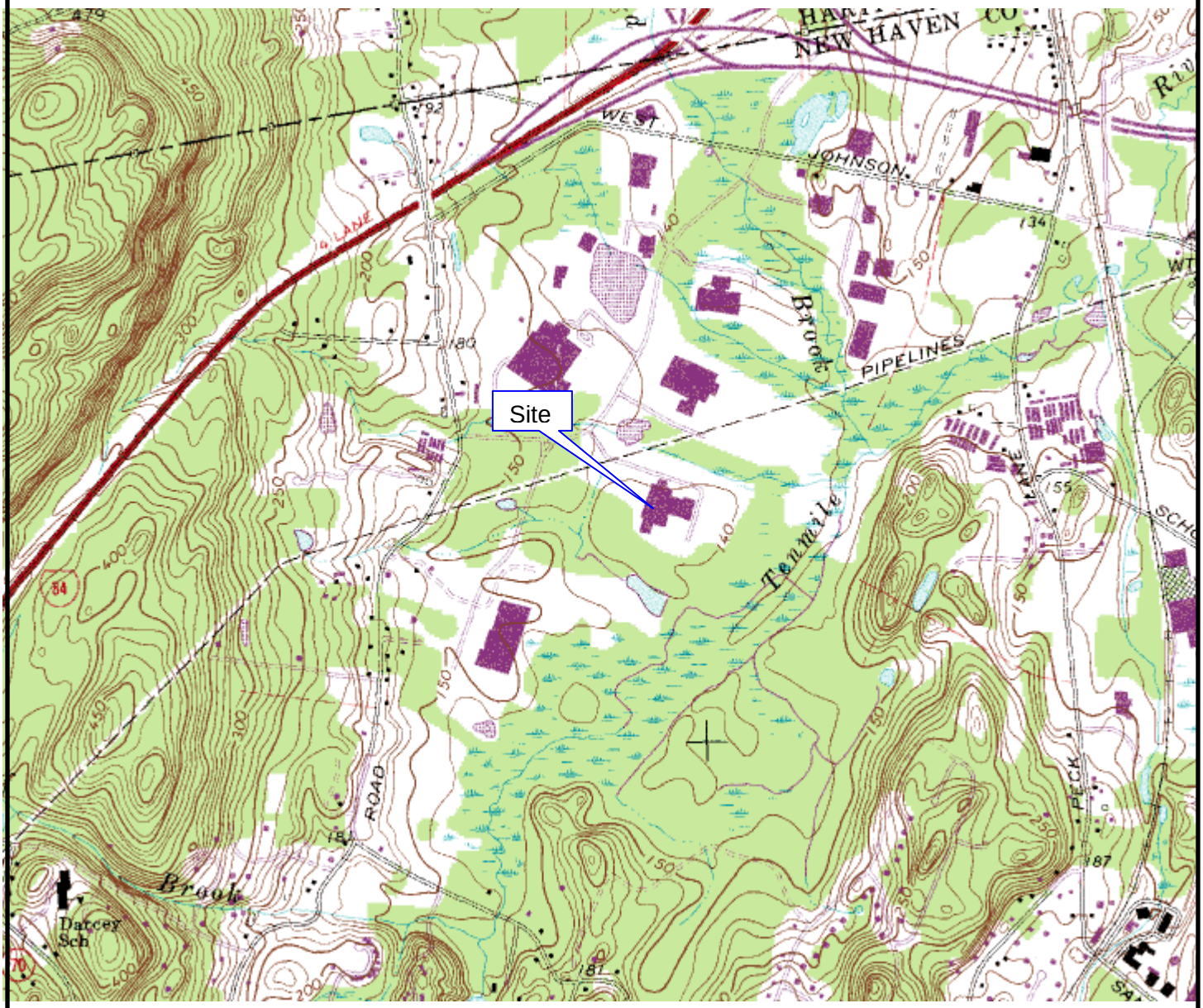
ENSR. 2007b. Quality Assurance Project Plan. Property Transfer/RCRA Closure at Arch Chemicals Inc., 350 Knotter Drive, Cheshire, Connecticut. May 2007.

U.S. EPA, 2001. Supplemental Guidance to RAGS, Region 4 Bulletins, Ecological Risk Assessment (Draft), U.S. EPA Region 4 Waste Management Division. http://www.epa.gov/region4/waste/ots/ecolbul.htm.

U.S. EPA, 2003. U.S. EPA Region 5 Ecological Screening Levels. Revision August 2003. Available at: http://www.epa.gov/reg5rcra/ca/edql.htm

U.S. EPA, 2005. Guidance for Developing Ecological Soil Screening Levels (Eco-SSLs). OSWER Directive 9285.7-55. February 2005.

FIGURES



Arch Chemical, Inc.
350 Knotter Drive
Cheshire, Connecticut

Site Locus

Arch Chemical, Inc.
350 Knotter Drive
Cheshire, Connecticut

April 2007

00489-014

FIGURE 1

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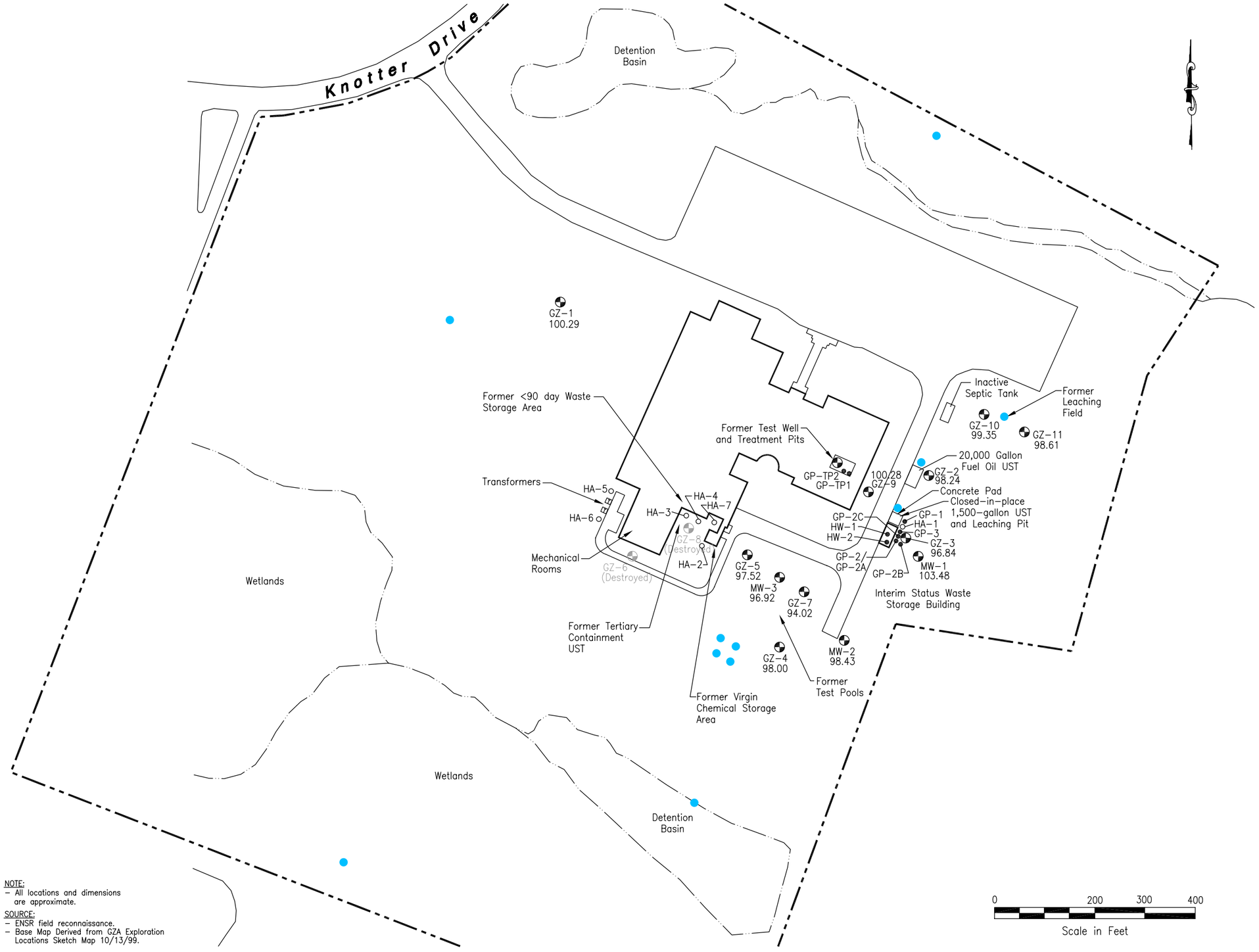

NOTE:
- All locations and dimensions are approximate.

SOURCE:
- ENSR field reconnaissance.
- Base Map Derived from GZA Exploration Locations Sketch Map 10/13/99.

LEGEND:

———	Approximate Property Boundary
GZ-9 100.28	Monitoring Well/Soil Boring with Well Head Elevation (installed by GZA, 1999)
GP-1 HW-1	Geoprobe Location
MW-1	Monitoring Well/Soil Boring with Well Head Elevation (installed by ENSR, 2001)
HA-1	Shallow Hand Auger Sample
●	Proposed Soil Sampling

Sampling locations are approximate. Final locations will be selected based on observed field conditions.

CLIENT

Arch Chemicals, Inc.
1200 River Road
Charleston, Tennessee 37310

PROJECT TITLE

Arch Chemicals, Inc.
350 Knotter Drive
Cheshire, Connecticut

FIGURE TITLE

Site Plan

APPROVED BY	REVIEWED BY
DRAWN BY: G. Moquin	SCALE: 1" = 200'
JOB NUMBER: 0489-004	DATE: February 2004

ENSR
2 Technology Park
Westford, Massachusetts
(978) 589-3000

Figure 2

SHEET

C:\048905B.DWG

ATTACHMENT 1

Agency Comments on the Draft Ecological Risk Assessment Work Plan

STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION

December 5, 2007

William Mitchell
Arch Chemicals Inc.
1200 Lower Ridge Road NW
P.O. Box 800
Charlestown, TN 37310

Re: Comments – Ecological Risk Assessment Work Plan for Arch Chemicals Inc., 350 Knotter Drive, Cheshire, CT
EPA ID No. CTD98016799

Dear Mr. Mitchell:

I am forwarding comments prepared by the Environmental Protection Agency Region 1 (EPA) on the Ecological Risk Assessment Work Plan dated April 2007 and submitted by ENSR Corporation for Arch Chemicals Inc., located at 350 Knotter Drive, Cheshire, Connecticut.

If you have any questions, you can contact Stephanie Carr of EPA at (617) 918-1363 or myself at (860) 424-3300.

Sincerely,

Sandra Brunelli
Environmental Analyst 3
Remediation Division
Bureau of Water Protection and Land Reuse

c: Ray Cody, EPA Region 1
Ms Michelle Snyder, Project Manager, ENSR, 2 Technology Park Drive, Westford, MA 01886-3140
Stephanie Carr US Environmental Protection Agency Region 1 New England, Congress Street, Suite 1100 (HBT) Boston MA 02114-2023

U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION I
OFFICE OF ENVIRONMENTAL MEASUREMENT & EVALUATION
11 TECHNOLOGY DRIVE, CHELMSFORD, MA 01863

DATE: November 13, 2007

SUBJ: *Review of the Ecological Risk Assessment Workplan, Arch Chemicals, Inc., 350 Knotter Dr., Cheshire, CT, dated April 2007*

FROM: David McDonald, OEME/ECA

TO: Ms. Stephanie Carr, USEPA Region1/RCRA/PM

Dear Stephanie:

Thank you for allowing us the opportunity to assist you in the review of the *Ecological Risk Assessment Workplan, Arch Chemicals, Inc., dated April, 2007.* The review was performed, on this document, utilizing supporting information i.e. a 2004 verification report to the State of Connecticut required with property transfer under the Connecticut Transfer Act and in accordance with the Remediation Standard regulations. The purpose of this review is to ensure that the ecological risk assessment (ERA) concerns relating to the study of this site meet the requirement of the RCRA program. Please be aware that the goals of the verification report and of an ERA under RCRA are quite different. Due to this difference the usefulness of the information in the verification report is limited.

As you will see by the review report below, the work currently proposed in support of the ERA effort falls short in providing the minimum necessary information allowing for a reasonable evaluation of ecological risk potential. All reasonably possible site related releases must be evaluated as they relate to risk of harm to ecological receptors expected or believed to be present. Media of ecological interest associated with this site include surface water, surface sediment from 0-6inches and surface soils from 0-2 feet in depth. It is reasonable to expect that each of these media is sampled to provide an accurate representation of contaminants present. These data would then be compared to ecologically relevant effects thresholds. In addition, the taking of local background samples, representing the various media of interest, should be considered to allow for a determination of site and non-site contributions of risk. The following attached review memo provides the results of the review.

If you have further questions or require further assistance, feel free to contact me at (617) 918-8609 or email me at mcdonald.dave@epa.gov.

Sincerely,

David F. McDonald
USEPA Region 1 Biologist

Review of the
Ecological Risk Assessment Work Plan,
Arch Chemicals Inc., Cheshire, CT.
dated April 2007

1.0 GENERAL INTRODUCTION

1.1 Task Description

The Environmental Services Assistance Team (ESAT) at the request of the Environmental Protection Agency (EPA) reviewed the Ecological Risk Assessment (ERA) Work Plan (WP) dated April 2007 that was prepared for the Arch Chemicals, Inc. facility (the Site), located in Cheshire, CT . The review included the use of additional information on the Site and on past site investigation efforts obtained from a Verification Report, dated March 2004.

The goal of the review was to ensure that the proposed WP allows for the evaluation of risk potential from suspected contaminated surface water, surface soil and surface sediment following USEPA ecological risk assessment guidance. The results of the sampling and analysis of these media in conjunction with ecological effects based screening values will result in information necessary to assess the potential for ecological risk from the Site.

1.2 Site History

The facility is located at the Cheshire Industrial Park, in Cheshire, CT. It covers about 75 acres, 45 acres of which are occupied by a 144,700 square foot building, lawns, a parking lot, and service roads. The remainder of the property consists of undeveloped wetlands, two detention basins, and wooded areas.

The Site was occupied by Siemens, a medical equipment manufacturing company, from its construction in 1975 to 1983. Olin Chemicals, Inc. (Olin) acquired the Site in 1983 for use as a Research and Development (R&D) laboratory focusing on swimming pool chemicals, surfactants, liquid toners, urethane compounds, and biocide compounds. Project-specific specialty chemicals, such as propellants for explosives, have also been used in R&D at the facility.

Arch Chemicals, Inc. (Arch) was created in 1999 as a separate entity comprising the former pool chemicals division of Olin. This transaction qualified as a property transfer under the State of Connecticut Transfer Act. A second Transfer Act requirement was triggered when Arch sold the facility in 2000. It currently leases a portion of the facility from the new owner to continue operations.

The Transfer Act assessment involved collecting soil and groundwater samples from Areas of Concern (AOCs) located throughout the Site to determine if the Site complied with the Connecticut Remediation Standard Regulation (RSR) or if remediation to achieve RSR compliance would be required. This investigation, which occurred between 1999 and 2002, showed that the Site met all applicable soil and groundwater criteria and that remediation was not necessary.

To meet corrective action obligations the facility is also required to evaluate current or future risk to the environment. As a consequence a Screening-Level Ecological Risk Assessment (SLERA) is scheduled to be performed at the Site in support of these activities. A qualitative habitat characterization was conducted in 2007 to identify on-Site ecological habitats and potential receptors, and to conduct a qualitative reconnaissance of the adjacent water bodies.

This technical memorandum is organized as follows: section 2.0 provides general comments on the WP, Section 3.0 provides specific comments on the WP, and section 4.0 is a summary and conclusion.

2.0 GENERAL COMMENTS

General comment 1:

The review identified major issues with the proposed WP for this Site. The analytical data proposed for use in the SLERA were collected for purposes other than ecological risk screening i.e. Connecticut Remediation Standard Regulation (RSR) which is a human health based risk evaluation.

Because ecological and human health risk evaluations often times require different types of data there are significant gaps with the current dataset.

The SLERA to be developed under the proposed WP will not provide the EPA with the information needed to make defensible ecological risk management decisions. It is recommended to amend the WP based on the comments provided below in order to develop a more defensible SLERA.

General comment 2:

The WP stated that the primary exposure pathways to be evaluated in the SLERA will be direct exposure to surface soils and surface water. Yet, the Site also contains two detention basins covering about five acres, and several wetland areas. Such habitats can concentrate contaminants in their sediment substrate. Therefore, it is necessary that sediment be included as a third exposure pathway to be evaluated in the SLERA. The immediate receptor group would be represented by benthic invertebrates. The WP needs to be amended to provide a sediment sampling program for the aquatic habitats associated with the Site in support of the SLERA. Appropriate conservative sediment screening benchmarks must be identified for use in the risk characterization of this medium.

General comment 3:

The WP proposed assessing risk to aquatic receptors in the wetlands and the two detention basins by applying a Dilution Attenuation Factor (DAF) to existing groundwater data. The reason for this indirect approach was that surface water samples have not been collected from the aquatic habitats at the Site. Clearly, sampling of surface water associated with areas of site discharge would provide the most compelling data with the least amount of uncertainty.

The proposed approach is unacceptable for three reasons: (1) it does not follow EPA ERA guidance which requires actual surface water data for use in a SLERA, (2) it uses the unproven assumption that groundwater at the Site discharged to the wetlands and/or the detention basins, and (3) it ignored potential contributions from overland flow, on-Site storm water outfalls from parking lots or service roads, or off-Site sources to these surface water habitats.

The WP needs to be amended to include a surface water sampling program at the Site in support of the SLERA. Samples need to be collected from all potentially impacted surface water bodies associated with site discharge. Consideration for seasonal exposure potential should be made as necessary. For example, if water bodies are seasonally flooded sampling of surface water should be taken during these times of exposure to sensitive receptors. See also General Comment 4 for additional considerations.

General comment 4:

The WP indicated that surface water from the two detention basins flowed into the nearby Ten Mile Brook, located less than one-quarter mile east of the Site. However, the report was unclear if these outflows were permanent or intermittent, the intensity of flows during discharges, or if they represented a separate aquatic habitat which should also be evaluated. More information needs to be provided to ensure that this potential habitat is included in the SLERA, if necessary. Additional surface water and sediment samples may need to be collected from these conduits or point of confluence depending on further information on characteristics of these areas.

General comment 5:

The WP did not discuss collecting background samples for soil, surface water, or sediment from nearby reference areas. Such analytical data can help determine if detected contaminants may have

originated from the Site or have a more regional distribution. The WP should be amended to collect the necessary media-specific, background samples in support of future eco risk-based decision making at the Site.

General comment 6:

The WP described the non-permitted release between 1984 and 1988 of chiller condensate and non-contact cooling water to a drainage ditch located to the southeast of the Site building. The presence of zinc in the discharge at 0.5 mg/L could be of potential ecological concern, both in the drainage ditch itself and/or in the area of discharge. More information on this ditch is required. The need for sampling of surface soil/sediment/surface water would be dependent on this information. If this drainage ditch is still exposed it is recommended to collect the appropriate number of sediment/soil samples from the drainage ditch for analysis of metals. If not, at the point of discharge and further downstream as necessary.

3.0 SPECIFIC COMMENTS

Specific Comment 1: 1.0 Introduction, §1.1 Site History, next to last ¶, p. 1-2.

This paragraph described the discharge of chiller condensate and non-contact cooling water to a drainage ditch located to the southeast of the Site building. About 4,000 gallons per day for about 150 days per year were released to this ditch between 1984 and 1988. This water was reported to contain zinc at a concentration of 0.5 mg/L, chlorine, and phosphate.

Figure 2 (Site Plan) included in the WP did not show the location of this drainage ditch. The WP also did not indicate where this water flowed. This information needs to be included and fully described in the WP. Depending upon this information, considering the volume of flow, the contaminants, and the duration of the discharge it is likely that sampling and analysis of the appropriate media at the point of discharge may be necessary.

Specific comment 2: 2.0 Problem Formulation, § 2.3 Selection of Specific Ecological Receptors and Exposure Pathways, 2nd ¶, 3rd sentence, p. 2-3.

This sentence reads as follows: "The existing soil data will be evaluated in the SLERA, even though it generally represents deeper soils than ecological receptors are expected to encounter (i.e., 0 to 6")". An issue with this proposed approach is that SLERAs should evaluate direct exposure of terrestrial receptors (soil invertebrates and plants) only to surface soil collected no more than two ft deep.

Table 1 in the Verification Report presented the historical soil data for the Site. Ten soil samples were available, none of which represented true surface samples. Instead, all soils were collected at depths of 0-4 ft (three samples), 4-8 ft (one sample), 6-8 ft (two samples), 7-8 ft (three samples), and 12-16 ft (one sample).

Only real surface soil samples will provide defensible analytical data. The WP needs to be amended to include the necessary surface soil sampling at the Site in support of the SLERA.

Specific comment 3: 2.0 Problem Formulation, § 2.4 Selection of Assessment and Measurement Endpoints, 1st ¶, p. 2-4.

The WP needs to be amended to include an additional assessment and measurement endpoint, as follows:

- Assessment Endpoint 3: The assessment endpoint is the sustainability of the benthic invertebrate community in aquatic habitats in the vicinity of the Site.
- Measurement Endpoint 3-1: Comparison of sediment analytical chemistry results to sediment screening values.

- **Specific comment 4: 2.0 Problem Formulation, § 2.5 Selection of COPCs, 1st ¶, 4th sentence, p. 2-4.**

This sentence reads as follows: "Constituents that were not detected will not be evaluated". This statement needs to be amended by including an additional safety check. The analytical detection limits (DLs) of the non-detected constituents need to be evaluated to ensure that DLs did not exceed the conservative screening benchmarks. A non-detected constituent should automatically be retained as a COPC if its maximum DL exceeds the screening benchmark. A non-detected constituent can be eliminated outright only if it lacks an acceptable screening benchmark.

Specific comment 5: 3.0 Risk Analysis, p. 3-1.

This section needs to be amended by including a third subsection titled "Benthic Receptor Risk Analysis" which will provide, in order of preference, the sources for sediment screening values to be considered in the risk analysis.

4.0 SUMMARY AND CONCLUSIONS

A review was performed on the ecological screening WP prepared for the Arch Site, located in Cheshire, CT. Several issues were identified with the proposed approach which would compromise the ability of the SLERA to validate a determination of the presence or absence of risk to ecological receptors at the Site. The major issues are summarized below:

- Sediment samples and surface water samples need to be collected from the various aquatic habitats (wetlands, detention ponds, outflow reaches) at the Site to assess the potential for ecological risk to aquatic receptors.

- Surface (0-2 ft) soil samples need to be collected from terrestrial areas known or suspected to be areas of contamination to assess the potential for ecological risk to soil invertebrates and plants.

- Sediment, surface water, and soil background samples need to be collected from reference areas to help differentiate Site- from non-Site related contamination.

- Sediment/soil samples should be collected from the drainage ditch or, if no longer present, at the historical point of discharge which received non-permitted releases of chiller condensate and non-contact cooling water between 1984 and 1988.

ATTACHMENT 2

Preliminary Responses to Agency Comments on the Draft Ecological Risk Assessment Work Plan

ENSR
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January 21, 2008

Ms. Sandra Brunelli
Remediation Division, Bureau of Water Protection and Land Reuse
Connecticut Department of Environmental Protection
79 Elm Street
Hartford, CT 06106-5127

Re: Preliminary Responses to USEPA Region 1 Comments on Ecological Risk Assessment Workplan for Arch Chemical, Inc Property at 350 Knotter Drive, Cheshire, CT.
EPA ID No. CTD98016799.

Dear Ms. Brunelli,

In April 2007, ENSR submitted a screening level ecological risk assessment (SLERA) Work Plan (WP) to the Connecticut Department of Environmental Protection (CTDEP) on behalf of Arch Chemical, Inc for their facility located at 350 Knotter Driver in Cheshire, CT. The SLERA was required in order to satisfy the requirements for site-wide RCRA Closure and terminate interim status at the site. CTDEP sent the SLERA Work Plan to the United Stated Environmental Protection Agency (USEPA) Region 1 for review. USEPA provided comments (dated December 5, 2007) on the SLERA Work Plan regarding the scope of the sampling and risk assessment components; with recommendations for increasing both. ENSR would like to discuss these comments further and provide additional clarification to the information provided in the SLERA Work Plan. To comply with the USEPA request for responses prior to this discussion, ENSR has generated the following preliminary responses to the General Comments to facilitate the upcoming dialogue.

Please note that with regards to the environmental impacts from Arch operations at the site, as well as operations that occurred prior to Arch's occupancy of the property, the site is virtually pristine. As discussed below, the only areas of concern were two minor subsurface releases, neither of which resulted in groundwater contamination above Connecticut Remediation Standard Regulation (RSR) Criteria.

General comment 1: *The review identified major issues with the proposed WP for this Site. The analytical data proposed for use in the SLERA were collected for purposes other than ecological risk screening i.e. Connecticut Remediation Standard Regulation (RSR) which is a human health based risk evaluation.*

Because ecological and human health risk evaluations often times require different types of data there are significant gaps with the current dataset.

The SLERA to be developed under the proposed WP will not provide the EPA with the information needed to make defensible ecological risk management decisions. It is recommended to amend the WP based on the comments provided below in order to develop a more defensible SLERA.

Response:

- ENSR understands the comment and USEPA's desire to have sufficient information to make defensible ecological risk management decisions to support CT DEP site closure process;
- The original intent of the media investigations and samples collected to date was for compliance with the requirements of the Connecticut Transfer Act Site Investigation and RCRA Clean Closure and not as part of a SLERA, therefore deeper soil samples were collected to determine if a release would be detected at the site. No release requiring further action was detected and no additional samples were collected. We understand that EPA has a concern that the use of deeper soils samples may not provide sufficient information to evaluate potential soil conditions in upper layers where ecological receptors exist;

- Regarding the Transfer Act and RCRA closure process, it is important to note that: the site had localized areas of concern with small spatial and vertical extent of contamination, levels of constituents of concern were low in soils and in groundwater, and that no remedial activities were required by CT DEP to close the site; and
- ENSR feels that providing a simple SLERA Work Plan for a site with these characteristics is justifiable, but acknowledges that insufficient information may have been provided along with original ERA Work Plan to allow USEPA to fully understand site history and activities. Therefore, ENSR would consider taking an appropriate number of confirmatory soil samples in the 0-2' range, as needed, to provide sufficient data to support ecological risk management decisions

General comment 2: *The WP stated that the primary exposure pathways to be evaluated in the SLERA will be direct exposure to surface soils and surface water. Yet, the Site also contains two detention basins covering about five acres, and several wetland areas. Such habitats can concentrate contaminants in their sediment substrate. Therefore, it is necessary that sediment be included as a third exposure pathway to be evaluated in the SLERA. The immediate receptor group would be represented by benthic invertebrates. The WP needs to be amended to provide a sediment sampling program for the aquatic habitats associated with the Site in support of the SLERA. Appropriate conservative sediment screening benchmarks must be identified for use in the risk characterization of this medium.*

Response:

- ENSR understands the comment, but disagrees that additional sediment sampling should be required for this site based on: site characteristics, nature of the contamination, the potential transport mechanisms involved, and concerns regarding upgradient sources;
- ENSR agrees that the SLERA should address the potential sediment exposure pathway; however, in ENSR's opinion, sediment sampling is not necessary, and a qualitative assessment is appropriate;
- Site releases were associated with a former UST and former treatment pits located beneath a building floor. Measured exceedance of media standards are confined to a few deep soils and groundwater samples. There is no evidence of a groundwater contaminant plume at the site;
- Site-related constituents (mostly VOCs, TPH, some metals) pose little potential for sediment contamination due to very poor potential transport of groundwater or soil into local wetlands or waterways; and
- Both detention basins get stormwater from upgradient industrialized areas and impervious surfaces and may have metals and TPH in sediments that are not related to the Site.

General comment 3: *The WP proposed assessing risk to aquatic receptors in the wetlands and the two detention basins by applying a Dilution Attenuation Factor (DAF) to existing groundwater data. The reason for this indirect approach was that surface water samples have not been collected from the aquatic habitats at the Site. Clearly, sampling of surface water associated with areas of site discharge would provide the most compelling data with the least amount of uncertainty.*

The proposed approach is unacceptable for three reasons: (1) it does not follow EPA ERA guidance which requires actual surface water data for use in a SLERA, (2) it uses the unproven assumption that groundwater at the Site discharged to the wetlands and/or the detention basins, and (3) it ignored potential contributions from overland flow, on-Site storm water outfalls from parking lots or service roads, or off-Site sources to these surface water habitats.

The WP needs to be amended to include a surface water sampling program at the Site in support of the SLERA. Samples need to be collected from all potentially impacted surface water bodies associated with site discharge. Consideration for seasonal exposure potential should be made as necessary. For example, if water bodies are seasonally flooded sampling of surface water should be taken during these times of exposure to sensitive receptors. See also General Comment 4 for additional considerations.

Response:

- ENSR agrees that the SLERA should address the potential surface water exposure pathway; however, in ENSR's opinion, surface water sampling is not the only means to evaluate this pathway;
- Site soil and groundwater contamination is localized and limited in spatial area and vertical extent. Potential fate and transport mechanisms at site do not result in identifiable "areas of site discharge" and any contaminant contribution to surface water from site activities are likely to be at worst *de minimis* in nature;
- ENSR feels incorporation of a conservative DAF (10:1) to evaluate GW is an appropriate way of addressing this potential exposure pathway, particularly due to the site characteristics and distance to waterbodies;
- Application of this 10:1 DAF to recent well measurements results in no exceedances of CT WQS at the site; and
- Both detention basins get tributary flow and stormwater from upgradient industrialized areas and impervious surfaces. Their water quality will be a function of the cumulative watershed land use, localized sources (e.g., overabundant geese populations), and not directly related to site activities.

General comment 4: *The WP indicated that surface water from the two detention basins flowed into the nearby Tenmile Brook, located less than one-quarter mile east of the Site. However, the report was unclear if these outflows were permanent or intermittent, the intensity of flows during discharges, or if they represented a separate aquatic habitat which should also be evaluated. More information needs to be provided to ensure that this potential habitat is included in the SLERA, if necessary. Additional surface water and sediment samples may need to be collected from these conduits or point of confluence depending on further information on characteristics of these areas.*

Response:

- As noted earlier, ENSR feels the potential surface water and sediment exposure pathway from the areas of contamination to local water bodies are *de minimis* in nature so sampling of these media for the SLERA is not warranted;
- Both detention basins get tributary flow and stormwater from upgradient industrialized areas and impervious surfaces. Their water and sediment quality will be a function of the cumulative watershed land use, localized sources (e.g., overabundant geese populations); and
- ENSR can provide some additional information on the hydrology and status of the two detention areas as part of the site ecological characterization

General comment 5: *The WP did not discuss collecting background samples for soil, surface water, or sediment from nearby reference areas. Such analytical data can help determine if detected contaminants may have originated from the Site or have a more regional distribution. The WP should be amended to collect the necessary media-specific, background samples in support of future eco risk-based decision making at the Site.*

Response:

- ENSR concurs that any soil sampling should include provisions for taking background samples to account for the light industrial land use that is prevalent in the areas including upgradient of the site. Given the common nature of many of the constituents of concern (metals, TPH, VOCs), this is particularly important;
- The Work Plan would also clearly identify the nature of site-related chemicals of concern;
- ENSR would consider taking an appropriate number of background soil samples in the 0-2' range to provide sufficient data to support ecological risk management decisions.

General comment 6: *The WP described the non-permitted release between 1984 and 1988 of chiller condensate and non-contact cooling water to a drainage ditch located to the southeast of the Site building. The presence of zinc in the discharge at 0.5 mg/L could be of potential ecological concern, both in the*

drainage ditch itself and/or in the area of discharge. More information on this ditch is required. The need for sampling of surface soil/sediment/surface water would be dependent on this information. If this drainage ditch is still exposed it is recommended to collect the appropriate number of sediment/soil samples from the drainage ditch for analysis of metals. If not, at the point of discharge and further downstream as necessary.

Response:

- ENSR uncovered older project files indicating that chiller condensate and non-contact cooling water were released as a permitted discharge licensed to Tenmile River; first as CT NPDES permit for discharge to Ten Mile River and later as Minor Non-Contact Cooling Water;
- CT DEP evaluated the biocides and corrosion inhibitors contained in these discharges and found they did not violate WQ standards;
- The ditch has not been used in approximately 15 years, is likely overgrown with vegetation, and available evidence (results from local monitoring well) shows no impacts to local groundwater.
- ENSR would consider sampling soil in ditch area for ecological risk decision-making.

Please review these preliminary responses and let us know if you have any questions regarding their content. Once we have established a meeting date with CT DEP and USEPA, we will forward an agenda and some additional documentation to support the main points raised above.

We look forward to your response.

Sincerely,
ENSR Corporation

David Mitchell
Senior Ecological Risk Assessor

Michelle Snyder, CHMM
Section Manager

Lawrence M. Hogan, PG, LEP
Senior Program Manager

Cc: Stephanie Carr, USEPA Region 1

ATTACHMENT 3

Portions of:
Stormwater Pollution Prevention Plan
Arch Chemicals Inc.
350 Knotter Drive
Cheshire, Connecticut
November 2000

350 KNOTTER DRIVE, P.O. BOX 586
CHESHIRE, CT 06410-0586

STORMWATER POLLUTION PREVENTION PLAN

Prepared by:

John R. Lesky, MS, CIH, CSP, CHMM

November 1, 2000

APPROVED: _____

John J. Margherio
Vice-President, Arch Chemicals, Inc.

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SECTION 1

INTRODUCTION

1.1 Purpose

The Arch Chemicals, Inc. Cheshire (Arch) facility is located at 350 Knotter Drive in Cheshire, Connecticut. The facility is involved in the improvement and development of a wide range of chemical products. Stormwater is discharged from the site and is subject to regulation as part of the National Pollutant Discharge Elimination System (NPDES) stormwater permit program. The Connecticut Department of Environmental Protection, Water Management Bureau (CTDEP), as authorized by the United States Environmental Protection Agency (EPA) has issued a General Permit for the Discharge of Stormwater Associated with Industrial Activity (General Permit) under Section of 22a 430(b) of the Connecticut General Statutes (as amended).

On November 23, 1992 Olin (Arch's predecessor company) filed a Notice of Intent (NOI) with the CTDEP requesting inclusion of this facility under the General Permit. A copy of this NOI is included in Appendix A of this report. Arch Chemicals, Inc. is an independent company created from the spin-off of Olin's specialty chemicals group. Arch operates under Standard Industrial Classification (SIC) codes 8731, however, the presence of a hazardous waste storage facility (Environmental Protection Agency (EPA) identification number CTD980916779) on-site requires that Arch comply with the General Permit. To complete the requirements of the General Permit, Arch has prepared and is implementing the following Stormwater Pollution Prevention Plan (SWPPP). This SWPPP has two major objectives:

1. to identify the sources of pollution at the facility that may affect the quality of industrial stormwater discharges; and

2. to describe and ensure the implementation of practices to reduce pollutants in the facility's industrial stormwater discharges.

Pursuant to the requirements of the General Permit, this SWPPP includes information concerning the following elements:

- a facility and site inspection and description;
- a description of the stormwater drainage system including existing treatment if any;
- a description of waste management practices;
- an inventory of materials with the potential for exposure to stormwater including location, management practices and spill control measures;
- a list of spills greater than five gallons occurring since October 1992;
- a non-stormwater discharge certification (Section 3);
- a description of non-structural source controls and management practices to reduce pollutants in stormwater;
- a description of structural controls to reduce pollutants in stormwater;

- a listing and description of responsibilities of employees responsible for plan implementation;
- a listing of employee training; related to stormwater pollution prevention;
- a description of required record keeping;
- a description of SWPPP evaluation and updating procedures; and
- a description of stormwater effluent monitoring and reporting requirements.

This SWPPP is to be retained on-site and is considered a report available to the public under Section 308(b) of the Clean Water Act. This SWPPP must be made available upon request of a representative of the CTDEP.

1.2 Background Information

Olin was established at the present location in 1984 and has been operating continuously up until the spin-off in February 1999. Since that time, Arch has operated the facility until its sale to WE Knotter Ltd. in March 2000. Since March 2000, Arch has only operated its leased portion (about 1/3 of the building), plus the waste storage shed. The Arch facility is located in the Cheshire Industrial Park, in a sparsely developed section of Cheshire. The property is surrounded on all four sides by existing industrial operations situated on large lots. These facilities are separated by undeveloped areas consisting of grassed open fields. **Figure 1-1** shows the location of the Arch facility.

Using a wide variety of advanced chemical and analytical techniques, the approximately 50 employees at the Arch facility are involved with research and development operations designed to support manufacturing operations, improve existing products, and develop new products. Currently, major ongoing research is in the biocide area. Other products are also being experimented with on a smaller scale. The types of products being researched are expected to evolve over time.

SECTION 2 (2)

SITE ASSESSMENT

Information in the following section was collected through site inspections, discussions with key Arch employees with detailed knowledge of the facility layout and operation, and use of information contained on existing maps and diagrams.

2.1 SITE DESCRIPTION

The Arch facility consisting of operation portion of the property, is approx. 40,000 sq.ft. located within the main facility building, in the northeast corner of a 75 acre parcel (the “property). The facility main building is approximately 135,000 square feet (sf) in size. The majority of the building is a single story structure constructed on a concrete slab. Major operations on the first floor include research laboratories, library, cafeteria, boiler room, loading dock, hazardous waste transfer room, and office space. The second floor of the building consists of two "towers" at the north and south corners of the building. These towers are used exclusively for office space.

An employee and visitor parking lot is located north of the building. This parking lot consists of 154,000 sf and is not considered as part of the facility for the purpose of this SWPPP, because hazardous materials are not stored, disposed, or transported over this area. There are approximately 72,000 sf of driveway surrounding the north and east sides of the building and leading up to the building from Knotter Drive. Other than paved areas, the area immediately surrounding the building is mowed lawn. The remainder of the property south and west of the building consists of mowed open field with a few small trees and shrubs. An additional feature on the subject property is an Algonquin Gas Transmission Company pipeline easement which crosses the northwestern corner of the property. This easement is vegetated and resembles other non-developed portions of the property.

Several areas or structures for outdoor storage are located around the Arch building. There are three dumpsters and one trash compactor located at the facility. A small dumpster is located on north side of the building near the cafeteria. The other two dumpsters for wood/metal, and cardboard, and the trash compactor are located near room A990 and loading dock on the south side of the building. All dumpsters are covered. One closed trailer, used to store pool supplies, is also located on the southeast side of the building. A hazardous waste and oxidizer storage facility, approximately 1,050 sf in size, is located south of the building. Along the eastern edge of the building, near the loading dock several empty drums are stored.

Topography on the property ranges from a high of 142 feet above mean sea level (MSL) along the southern side of the building to a low of 132 feet above MSL in the northeast corner of the property. The property is fairly flat to gently rolling. The site is generally level. The ground slopes away from the building in all four directions.

An approximately 2.5 acre pond is located in the northwest corner of the property. The pond is supplied by an unnamed stream entering the property under Knotter Drive which it to the west of the property and pond. This pond is a retention basin for stormwater runoff from Knotter Drive. The Town of Cheshire controls a drainage easement across the property from Knotter Drive to the pond. The unnamed stream exits the east side of the pond and flows from west to east along the northern edge of the Arch property.

Ultimately, the stream discharges to the Ten Mile River east of the property. Another pond, approximately one acre in size is located along the eastern edge of the property near the property's southeast corner. This

pond discharges stormwater from the undeveloped portions of the property via another stream to the south of the property.

The pond near the southeast corner of the site is fed by a wetland area located in the central portion of the property. There are two other wetland areas on the property. One is located in the central portion of the site and the other is located in the southwest corner of the property. These two wetland areas are connected by an intermittent stream that flows from the central portion of the property to the southwest corner.

Portions of the property not covered by impervious structures such as parking lots, buildings and driveways consist of vegetated open field, mowed lawn or wetlands. Topography is gently rolling. No areas of bare soil are present on the property. Based on this information, the potential for erosion at the property is low.

There are no other areas, structures or activities such as vehicle storage or maintenance facilities at Arch that could contribute pollution to stormwater runoff. **Figure 2-1** shows an overall plan of the property. **Figure 2-2** shows the active areas of the facility in details.

2.2 (3h,i) STORMWATER DRAINAGE SYSTEM AND DRAINAGE AREAS

Based on the large percentage of wetlands on-site and the vegetated nature of upland areas, little or no runoff occurs from undeveloped areas of the property. Due to the flat topography, the presence of wetlands and two ponds on the property, any rainfall that does not immediately infiltrate during a storm event will accumulate on the land surface, in wetland areas or ponds, and eventually evaporate or infiltrate into the ground.

Rainfall within the wetland systems on the undeveloped portions of the property enters a wetland area at the southwest corner of the site. Stormwater from this area flows via an intermittent stream to the central portion of the property. Stormwater from the central portion of the property flows into the pond located in the southeast corner of the site. During storm events, a small amount of stormwater discharges from this pond via an intermittent stream across the eastern property boundary. Arch has never used the undeveloped portion of the property for industrial, waste storage, or waste disposal purposes, therefore, by definition (General Permit, Part IV.4.) undeveloped portions of the property are not subject to the General Permit.

A portion of the stormwater runoff from this part of the driveway is discharged as overland flow to vegetated areas on either side of the driveway, eventually entering the unnamed stream along the northern edge of the site. The remainder of the runoff from this portion of the driveway is collected in five catch basins, two of which are located on either side of the driveway near Knotter Drive. These catch basins discharge via a 24 inch reinforced concrete pipe (RCP) to a grassed swale along Knotter Drive which in turn discharges to the stream flowing into the retention pond in the northwest corner of the property. Two of the catch basins are located on either side of the driveway approximately 350 feet east of Knotter Drive. These catch basins discharge via a 24 inch RCP to a grassed swale which in turn discharges to the retention pond. The fifth catch basin is located on the south side of the driveway at the point where the driveway enters the employee/visitor parking area. This catch basin also discharges via a 24 inch RCP to a grassed swale which flows to the retention pond. The driveway areas are subject to the General Permit as trucks delivering hazardous materials and removing wastes from the site, access the facility along this driveway.

All the remaining driveways and small paved areas surrounding the facility to the north, east, and south of the building as well as the employees/visitor parking area are curbed. Stormwater runoff from the driveways, the loading area, outside drum storage area, the outdoor experimental pools, the dumpsters, and the hazardous waste storage building are directed via the curbing to three catch basins, two of which are located either side of the driveway near the northeast corner of the building. The third catch basin is located near the loading dock at the southeast corner of the building. These three catch basins discharge via a 30 inch RCP to the unnamed stream leading from the detention pond and flowing along the northern edge of the property.

All stormwater from the roof of the building is collected by roof drains and discharge to the same 30 inch RCP which collects and discharges stormwater from the driveways to the north, east and south of the building. There are four stacks for laboratory hoods on the roof. There are also other stacks on the roof that vent various pieces of laboratory equipment. Based on the small quantities of materials released by these stacks it is unlikely that fumes from these structures will impact stormwater runoff from the roof.

All three dumpsters are placed on paved areas adjacent to the driveways. Runoff from these paved areas is collected and discharged with runoff from the driveways. Runoff from the vicinity of the hazardous waste storage building, located east of the driveway along the eastern side of the building, is also collected and discharged with runoff from the driveways.

Stormwater runoff from the employee/visitor parking area discharges via one of five paved leakoffs located along the northern edge of the parking lot to the unnamed brook located along the northern edge of the property. This area is used for parking only. No raw materials, finished products or waste are stored or transported in this area, therefore, this area is not subject to the General Permit. Stormwater drainage areas, stormwater flow patterns and topography are shown on **Figure 2-1** and **2-2**.

2.3 BUILDINGS AND INDOOR OPERATIONS

All operations occurring at the Arch facility occurs inside the single building or within the hazardous waste storage building. The hazardous waste storage building is described in Section 2.5 of this report, and currently stores no waste. All chemical storage is indoors. All loading and unloading of chemicals occurs within an enclosed loading dock. Trucks back up to the dock and unload directly into the building. The potential for these chemicals to come in contact with stormwater is low.

Less than 55 gallon quantities of chemical waste are managed under the “satellite accumulation” rule in the laboratories and work areas throughout the main building.

All chemical wastes in the main building are collected and temporarily stored in the “waste transfer room” (G1) located on the southeastern side of the building. This room has secondary containment consisting of a sealed and sloped concrete floor and separate bermed areas for drums of solvent, basic, and acid wastes. Except when transferring waste to the unattached hazardous waste storage building, there is no potential for these chemicals to come in contact with stormwater runoff.

2.4 STORAGE TANKS

Arch does not own nor operate and storage tanks on this property.

2.5 WASTE MANAGEMENT

There are three streams of waste leaving the Arch facility. Solid waste refuse is collected from throughout the facility and disposed in a dumpster located outside the loading dock. Recyclable waste is disposed of in a second dumpster outside the loading dock. There is no on-site disposal of solid waste at the Arch facility. Due to the research nature of the facility, a relatively large numbers of chemicals are utilized in the Arch facility. The chemical wastes generated in individual labs are transferred to a temporary waste transfer room located adjacent to the loading dock. Prior to transfer to the hazardous waste storage building, these lab size chemicals are packed in 5 to 55-gallon drums and insulated with vermiculite. The drums act as secondary containment for the lab packs. These procedures virtually eliminate the possibility that these wastes would come in contact with stormwater runoff during transfer to the hazardous waste storage areas.

Larger quantity hazardous wastes generated at Arch include mixed solvents and mixed acids. Waste acids and solvents are also collected in the temporary waste transfer room. These wastes are collected and stored in 55-gallon drums. There is no on-site disposal of hazardous waste at the Arch site. Approximately 6,000 pounds of hazardous waste are generated annually at Arch.

The waste transfer room within the Arch facility is constructed of concrete. Berms to contain spills are located at all doorways. Less than drum quantity chemicals are stored in plastic trays on metal shelves along one wall of the room. Drums of waste solvents, waste acids, and bases are stored in the bermed area.

The hazardous waste storage building is located approximately 120 feet east (across the driveway) from the outside doorway to the chemical waste transfer room. This area is slated for closure and no wastes are stored within.

Previously Olin and Arch had a Minor Non Contact Cooling Water General Permit (GW000060) to discharge all of the facility's non-contact cooling water to the Town of Cheshire Publicly Owned Treatment Works (POTW). Upon sale of the building, Arch no longer maintains this permit.

Table 2-1

POTW Individual Permit
Parameters and Concentrations

Parameter	Minimum Frequency of Sampling	Maximum Concentration or Restriction
Total Copper	Monthly	No Limit
Total Lead	Monthly	No Limit
Total Zinc	Monthly	No Limit
Total Suspended Solids	Monthly	No Limit
Biological Oxygen Demand (BOD-5)	Monthly	No Limit
Chloroform	Monthly	10.0 mg/l (daily max.)
Methylene Chloride	Monthly	5.0 mg/l (daily max.)
pH	Monthly	Not less than 6.0 and not greater than 10.0

mg/l = milligrams per liter

Sanitary wastes are also discharged to the sanitary sewer. These discharges are directed from the facility directly to the Town of Cheshire sanitary sewer collection system. There is little possibility that the wastes from the sanitary system could contaminate stormwater runoff from the property.

2.6 (2b) INVENTORY OF EXPOSED MATERIALS

A large variety of chemicals are handled at the Arch facility. The majority of these materials are used in small quantities for laboratory experiments. Based on material handling, storage, and waste handling procedures described in previous sections of this report, none of these laboratory chemicals has a significant potential to pollute stormwater runoff from the property and should not be considered under the General Permit. Based on the site inspection and discussions with key Arch employees, **Table 2-2** lists an inventory of materials and waste, including information on their purpose, location, method of storage, quantity, control measures, and exposure that have been handled at the facility since October 1993. **Table 2-3** lists materials at the Arch facility that are handled in a manner that allowed exposure to stormwater since October 1, 1993.

2.7 (2c) SPILLS AND LEAKS

There have been no spills and leaks of toxic or hazardous substances in quantities greater than five gallons occurring at Olin or Arch since October 1, 1993. **Table 2-4** will be used to log future spills.

A few spills consisting of small amounts of chemicals has also occurred in the Olin facility since October 1, 1993. These spills were under five gallons in quantity and occurred within the building with no potential of affecting stormwater.

TABLE 2-2

SWPPP MATERIAL INVENTORY Arch Research Center Cheshire, Connecticut				**Completed by: John Lesky Date: November 1, 2000**			
Material	**Purpose\Location**	**Quantity (Units)**		**Exposed in Last 3 Years**	**Likelihood of contact with stormwater. If yes, describe reason**	**Past Significant Spill or Leak**	
		Stored	**Discharged**			**Yes**	**no**
Waste Solvent Mixture	Waste solvents from labs accumulated in transfer room than drummed and transferred to HW storage building.	<1,000 gal	0	No	Slight, during transfer of drums across driveway to HW storage facility.		No
Waste Acid Mixture	Waste acids from labs accumulated in transfer room then drummed and transferred to HW storage building.	<1,000 gal	0	No	Slight during transfer of drums across driveway to HW storage facility.		No
Lab Packs and Miscellaneous Isocyanates	Laboratory size chemical waste packed in containers 5-55 gallons in size in the transfer room then moved to HW storage building	<1,000 lb.	0	No	None, drums act as secondary containment. Extremely low potential for this material to come in contact with stormwater.		No

TABLE 2-3

SWPPP INVENTORY OF EXPOSED MATERIAL Arch Corp. Cheshire, CT					Completed by: John Lesky Date: November 1, 2000
Description of Exposed Significant Material	**Period of Exposure**	**Quantity Exposed (units)**	**Location (as indicated on the site map)**	**Method of Storage or Disposal (e. g., pile, drum, tank)**	**Description of Material Management Practice (e.g., pile covered, drum sealed)**
None					

TABLE 2-4

SWPPP LIST OF SPILLS AND LEAKS Arch Research Center Cheshire, Connecticut	Completed by: Dave Smith. Date: August 30, 1996

October 1992 To October 1993

				Description					
Date (month/day/year)	Spill	Leak	Location (as indicated on site map)	Type of Material	Quantity	Source, If Known	Reason	Response Procedure	Preventive Measures Taken
None		*							

October 1993 To October 1994

				Description					
Date (month/day/year)	Spill	Leak	Location (as indicated on site map)	Type of Material	Quantity	Source, If Known	Reason	Response Procedure	Preventive Measures Taken
None		*							

October 1994 To October 1995

				Description					
Date (month/day/year)	Spill	Leak	Location (as indicated on site map)	Type of Material	Quantity	Source, If Known	Reason	Response Procedure	Preventive Measures Taken
None		*							

2.8 Summary Of Significant Findings

Based on the information obtained and presented above, there is no potential to contaminate stormwater.

A minor potential would be the dumpsters were they to be left uncovered. Since covers are permanently affixed and employees trained to keep them closed, this potential is very low.

SECTION 3 (3f)

CERTIFICATION - ABSENCE OF NON-STORMWATER DISCHARGES TO THE STORMWATER SYSTEM

3.1 Background

As part of the overall stormwater assessment that was conducted for the preparation of this SWPPP, a comprehensive review of the stormwater system for the Olin Chemicals Research property was conducted to certify that no non-stormwater discharges were being directed to the stormwater sewer system. This review included:

- inspection of the storm sewer system in December 1997;
- review of the engineering plans and drawings for the building, including the layout of floor drains;
- inspection of the facility's material storage and waste handling systems for other evidence of discharge to the stormwater drainage system; and
- interviews with Olin employees familiar with waste management practices and facility systems.

Based on this review, it was determined that there are no known non-stormwater discharge from the facility.

It was determined that all hazardous wastes generated on-site are properly collected, and stored prior to disposal off-site. Finally, it was determined that all floor drains and sinks in the facility discharge to the sanitary sewer system.

3.2 Certification

I certify that in my professional judgment, the discharge from the facility consists only of stormwater associated with industrial activity. This certification is based on evaluation of the stormwater discharge from the site. I further certify that all potential sources of non-stormwater at the site, a description of any test and/or evaluation for the presence of non-stormwater discharges, the evaluation criteria or testing method used, the date of any testing and/or evaluation, and the on-site drainage points that were directly observed during the test have been described in detail in the Stormwater Pollution Prevention Plan prepared for the site. I further certify that no interior building floor drains exist which are connected to any storm drainage system or which may otherwise direct interior floor drainage to exterior surfaces. I am aware that there may be significant penalties for false statements in this certification, including the possibility of fine and imprisonment for knowingly making false statements.

_____
Refer to original certification

Date: _____

SECTION 4 (3a-d)

NON-STRUCTURAL SOURCE CONTROLS AND MANAGEMENT PRACTICES

Arch already has comprehensive, applicable non-structural plans and procedures which apply to various housekeeping, material handling and emergency situations. These plans and procedures are well suited to preventing releases that may contaminate stormwater, and have been incorporated by reference into this portion of the SWPPP.

4.1 Good Housekeeping Procedures

The entire Arch facility including laboratories, storage areas, offices and maintenance and utility areas, is covered by comprehensive housekeeping procedures. Line managers are responsible for preparing and posting housekeeping regulations. These regulations should include the following minimum acceptable standards, however, it is the responsibility of the line manager to set higher standards as necessary.

- all work areas should be free of obstruction and cleaned after completion of an operation or at the end of the day;
- all chemical wastes should be properly managed and disposed;
- spills must be cleaned immediately;
- all surfaces should be cleaned regularly;
- stairways, hallways and laboratory hoods should not be used for storage;
- access to emergency equipment should be free of obstructions;
- floors must be kept dry; and
- corrosive chemicals should not be stored above eye level.

A copy of Arch's Housekeeping Standards is included in **Appendix C** of this report.

4.2 Material Handling

Arch has established procedures for implementation and administration of Hazardous Communications Standards including material handling. This program is designed to ensure that all employees are informed of known and potential work place hazards. The program also establishes the availability of health and safety information relative to all work areas. Elements of this program includes:

- maintain a master list of hazardous chemicals used in the facility;
- maintain Material Safety Data Sheets (MSDS);
- Develop and implement training programs for all employees (training is discussed in Section 6.2 of this report);
- ensure proper container labeling;
- maintain all appropriate records pertaining to hazardous materials;

A copy of Arch's Hazard Communication Program, for the handling of hazardous materials are included in **Appendix D** of this report.

Arch also has comprehensive guidelines detailing procedures for handling chemical wastes. All personnel who generate, handle and/or dispose of chemical wastes are subject to these procedures. Arch's Chemical Waste Handling Procedure was designed to address all applicable State and Federal hazardous waste management regulations. The Procedure includes SOPs for:

- employee responsibility;
- waste separation and classification;
- container management;
- container labeling;
- accumulation limits;
- recycling or returning unused chemicals;
- rinsing empty containers; and
- disposing of empty containers.

A copy of Arch's Chemical Waste Handling Procedure is included in **Appendix E** of this report.

4.3 Spill Contingency Plan

In accordance with Title 40 of the Code of Federal Regulations 265 sub-part D and Section 22a-449(C)-105 of the Connecticut Hazardous Waste Management Regulations, Arch has prepared a contingency plan for emergencies (explosion, spill, fire, or leak, etc.) associated with its hazardous waste storage facility.

In the event of a small spill or leak outside the drum storage areas, and if containment can be performed without risk to the safety of facility personnel, the person at the site will contain the spill and contact the Primary or Alternate Emergency Coordinator. In the event of larger spill or leak at the Arch facility, the following general procedures should be followed:

- notify appropriate emergency personnel;
- contain spills outside storage area with absorbent;
- contain drum or line leak;
- when spill is contained, clean up using absorbent material immediately; and
- transfer remaining material to a new drum.

Complete emergency contingency plan information is included in the policy. A copy of this plan is included in **Appendix F** of this report.

SECTION 5

PROPOSED STRUCTURAL CONTROLS

Based on a site inspection conducted in December 1997, stormwater control and minimization of the possibility of stormwater runoff contamination due to operations occurring at the Arch facility is very good. Almost all activities are conducted indoors and do not represent significant sources of stormwater contamination. A review of the limited potential sources of stormwater contamination has been previously presented in Section 2 of this report.

Based on these limited potential sources of stormwater contamination, no significant stormwater actions or programs are planned. However, the following minor program will be implemented:

- SWPPP team members will monitor and enforce the policy to keep dumpsters covered at all times.

SECTION 6

PLAN IMPLEMENTATION

6.1 (1) Stormwater Pollution Prevention Team

Implementation of this SWPPP is a collaborative effort on the part of managers, supervisors, and applicable staff. Table 6-1 lists individuals that have primary responsibility for implementing the provisions of this SWPPP.

Table 6-1

SWPPP POLLUTION PREVENTION TEAM Arch Corp. Cheshire, Connecticut		**Completed by: John R. Lesky Date: January 16, 1998**	
Member	Title	Office Phone	Responsibilities
Team Leader: John Lesky	Safety/Environmental Manager	(203) 271-4076	Coordinate all stages of SWPPP development and implementing procedures; coordinate employee training applicable to employee training programs; maintain records; ensure reports are submitted; update SWPPP; oversees inspections; and acts as emergency coordinator/ incident commander for Arch facility
Team Members: Ed Grabowski	Back-up Incident Commander	(203) 271-4285	Note process changes; help conduct inspections; ensure preventative maintenance is performed; ensure "good housekeeping" procedures
Kevin DiNicola	Back-up Incident Commander	(203) 271-4219	

Group Responsibilities: Develop and update various SWPPP elements; choose appropriate stormwater management options.

6.2 (3e) Employee Training

All team members and appropriate employees are required to be familiar with the procedures outlined in this SWPPP. Within Arch, all employees potentially exposed to hazardous chemicals in their work area receive training at the time of assignment to that area and whenever a new hazard is introduced into their area. In addition, written standards for hazardous chemical handling are kept in all work areas. Employee training consists of the following elements:

- identifying health and physical hazards of chemicals in the work area;
- identify practices to avoid that could contaminate stormwater;
- methods of detecting chemical releases;
- identifying methods to protect employees from exposure; and
- explaining the details of the Hazard Communication Program.

Details of Arch's training program are included in **Appendix D** of this report, which contains a copy of Arch's Hazard Communication Program.

In addition to this training, safety/environmental employees involved with disposal of hazardous wastes have received advanced training including OSHA Technician and Incident Commander training according to OSHA 29 CFR 1910.120, Hazardous Waste Safety Training. These individuals are most likely to be responding to, and supervising the containment and clean up of major spills or leaks. The training currently conducted is sufficient to make the appropriate employees aware of procedures necessary to minimize the potential for stormwater contamination.

6.3 (3f) Facility Inspection

All areas of the facility and all equipment, including emergency equipment at the Arch facility are inspected on a regular basis by the personnel of each area in accordance with the Safety Inspection Program (included in **Appendix G**) and the Housekeeping Standards Inspection Checklist (**Appendix C**). In addition, members of Arch's Goal is Zero Team also conduct periodic inspections of the facility. During the inspection, hazards are classified and monthly inspection reports, including corrective action, are prepared.

The objective of Arch's inspection program is to discover hazardous conditions that may cause injury, damage to property or production loss. The inspections also insure that:

- work practices conform with established SOPs;
- leaks are promptly repaired;
- equipment is in good condition and properly utilized;
- materials do not create an uncontrolled health, explosion or fire hazard;
- personal protective equipment is properly maintained;
- all surfaces are in a safe condition; and
- proper chemical storage, handling, and use practices are maintained.

The inspections conducted under Arch's Housekeeping procedures and Safety inspection program include all areas necessary to ensure that the potential for releases to stormwater are minimized.

6.4 Record Keeping and Reporting Procedures

All environmental permits, records and plans (including this SWPPP and all referenced documents) are maintained in the offices of the Safety/Environmental Manager. All engineering records relevant to the stormwater drainage system, internal drainage system including floor and sink drain schematics and related engineering operations are maintained in the Facility Maintenance Department.

6.5 (4) Comprehensive Site Compliance Evaluation and Update

The SWPPP must be updated regularly. In order to update the plan, compliance site evaluations must be completed twice per year. The following steps must be taken to update this SWPPP:

- a visual inspection of all material handling areas;
- observation of all control measures designed to prevent materials from contaminating stormwater; and
- a visual inspection of all equipment required to implement this plan.

After inspections are completed, a report summarizing the results of the inspection, personnel making the inspection, dates of the inspection and actions taken during the inspection should be prepared. This report should be kept as part of this SWPPP for at least five years. In addition, the plan will be amended within 10 days when:

- there is a change at the facility which has an effect on the potential to discharge pollutants to stormwater runoff; and/or
- if the actions required in the plan fail to adequately prevent pollution of stormwater runoff.

In addition, if Arch's procedures regarding housekeeping, material handling, waste handling, facility inspection, employee training, or emergency contingency are changed, revised or updated; this SWPPP should also be updated by replacing the revised document in the appropriate appendix, if appropriate.

SECTION 7 (2d)

STORMWATER MONITORING

7.1. Collection Times And Parameters To Be Monitored

In accordance with the CTDEP General Stormwater Permit, a sample of stormwater runoff from the subject property should be collected and analyzed at least once per year. The grab sample should be collected within the first 30 minutes of flow from a storm event that produces more than 0.1 inch of rainfall and that has occurred at least 72 hours after the last storm event which produced more than 0.1 inch of rainfall. If possible the sample should be collected from a storm event that does not exceed the area's average or median rainfall amount by than 50 percent (as measured by rainfall intensity during the first 30 minutes of the rainfall). Snow melts should not be used to collect the sample. All samples should be collected as grab samples.

A Stormwater Monitoring Report for the storm event must be completed and submitted within 90 days of monitoring, to CTDEP. A copy of this report which will contain at a minimum the information listed in Table 7-1 should be kept with the SWPPP.

TABLE 7-1

FACILITY INFORMATION	SAMPLING INFORMATION	MONITORING RESULTS
		Parameters:
Name , Address (owner, operator)	Sample Location	Oil & Grease
Site Address	Date /Time Collected	pH
Contact Person	Person Collecting Sample	Chemical Oxygen Demand
Phone Number	Storm Magnitude (inches)	Total Suspended Solids
Receiving Water (name, basin)	Storm Duration (hours)	Total Phosphorus
Stormwater G.P. Registration #	Date of Previous Storm Event	Total Kjeldahl Nitrogen
SIC Code	Rainfall pH	Nitrate Nitrogen
		Ammonia Nitrogen
		Chlorine (Residual)
		MBAS (Surfactants)
		Fecal Coliform
		Total Copper
		Total Zinc
		Total Lead
		Biological Oxygen Demand
		Chloroform
		Methylene Chloride
		24 Hr. LC50 (Aquatic Toxicity)
		48 Hr. LC50 (Aquatic Toxicity)

The above parameters include those required by Arch under POTW Individual Permit SP0000605, the chemical sampling parameters under this permit must also be analyzed.

Results of stormwater analysis should be retained with this SWPPP for at least five years.

In order to perform analysis for these parameters, samples must be collected in the following containers. Preservatives are indicated where necessary.

- Oil and Grease - one quart glass jar with sulfuric acid;
- pH, TSS and Nitrate - one half gallon plastic jar;
- Total copper, zinc and lead - one quart plastic jar with nitric acid;
- COD, TKN, and phosphorous - one half gallon plastic jar with sulfuric acid;
- Fecal coliform - one eight ounce sterile plastic jar; and
- Aquatic Toxicity - one half gallon glass jar.

7.2 Sampling Location

There are four stormwater outfalls from locations on the property subject to the General Permit. Three of these outfalls discharge water from the driveway. The fourth outfall discharges stormwater runoff from the facility roof, driveways around the building and paved areas that include the hazardous waste storage facility, loading dock area, dumpster areas, and the route used to transfer chemicals from the transfer room in the main building to the hazardous waste storage building. The employee/visitor parking lot is not subject to the General Permit because it is not used by vehicles carrying raw materials or hazardous waste.

Sampling should occur at the discharge that collected stormwater from the facility roof and paved areas surrounding the facility. This discharge point is representative of stormwater discharged from the site. The sample is collected as stormwater leaves the pipe prior to entering the unnamed stream so that contaminants from stormwater discharge from Knotter Drive will not contaminate the sample. Drainage areas, discharge points and the sampling location are shown of **Figure 7-2** attached to this plan.

If additional site development occurs, additional discharge points added, or new processes undertaken at the facility; the location and/or number of sampling points will be reevaluated and changed as necessary.

7.3 Prior Sampling Data

On July 15, 1997 stormwater grab samples were collected from the Olin property. The analytical results of samples, performed for the parameters required by the General Permit and for other active permits at this site are included in **Appendix G** of this report.

SECTION 8

CERTIFICATION OF STORMWATER POLLUTION PREVENTION PLAN

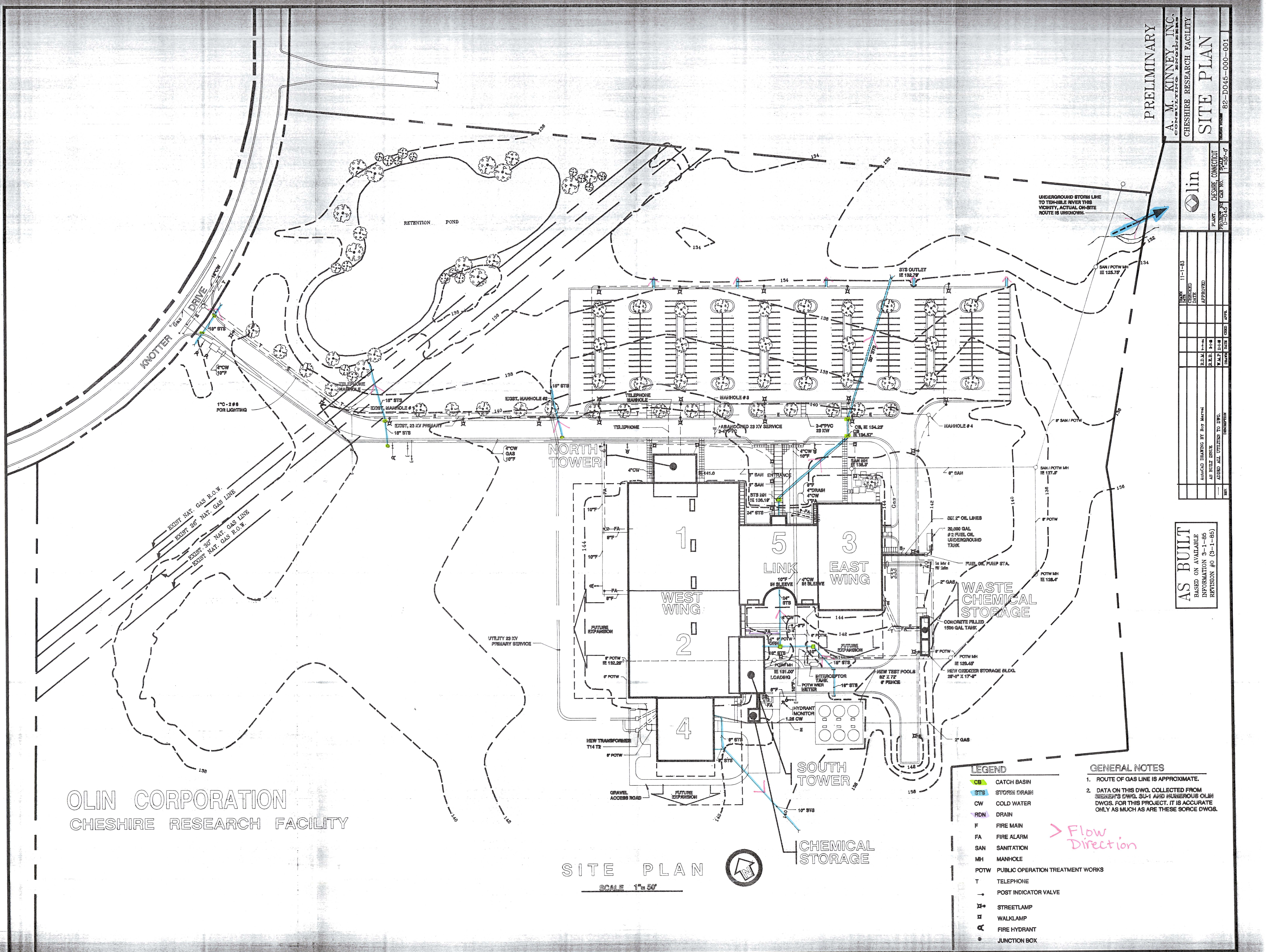
I certify that in my professional judgment, the Stormwater Pollution Prevention Plan prepared for this site meets the criteria set forth in the GENERAL PERMIT FOR THE DISCHARGE OF STORMWATER ASSOCIATED WITH INDUSTRIAL ACTIVITIES issued on July 22, 1992, and Modified October 1, 1995. This certification is based on my review of the stormwater pollution control plan for the facility and an inspection of the site. I am aware that there are significant penalties for false statements in this certification, including the possibility of fine and imprisonment for knowingly making false statements.

_____

see original certification

ATTACHMENT 4

1983 As-Built Site Plan



PRELIMINARY
A. M. KINNEY, INC.
CONSULTING ENGINEERS
CHESHIRE RESEARCH FACILITY
SITE PLAN
82-D045-000-001
Olin
CHESHIRE, CONNECTICUT
SCALE 1"=50'-0"
AS BUILT
BASED ON AVAILABLE
INFORMATION 3-1-85
REVISION #0 (3-1-85)
AutoCAD DRAWING by Roy Marvel
AS BUILT ISSUE
ADDED ALL UTILITIES TO DWG.
UNDERGROUND STORM LINE TO TEN-MILE RIVER THIS VICINITY, ACTUAL ON-SITE ROUTE IS UNKNOWN.
RETENTION POND
KNOTTER DRIVE
EXIST. NAT. GAS R.O.W.
EXIST 26" NAT. GAS LINE
EXIST 30" NAT. GAS LINE
EXIST. NAT. GAS R.O.W.
NORTH TOWER
1
WEST WING
2
5
LINK
3
EAST WING
4
WASTE CHEMICAL STORAGE
SOUTH TOWER
CHEMICAL STORAGE
FUTURE EXPANSION
20,000 GAL #2 FUEL OIL UNDERGROUND TANK
FUEL OIL PUMP STA.
CONCRETE FILLED 1500 GAL TANK
NEW OXIDIZER STORAGE BLDG.
NEW TEST POOLS
INTERCEPTOR TANK
HYDRANT MONITOR
NEW TRANSFORMER
GRAVEL ACCESS ROAD
UTILITY 23 KV PRIMARY SERVICE
TELEPHONE
MANHOLE #4
STS OUTLET
OLIN CORPORATION
CHESHIRE RESEARCH FACILITY
SITE PLAN
SCALE 1"= 50'
LEGEND
CB CATCH BASIN
STS STORM DRAIN
CW COLD WATER
RDN DRAIN
F FIRE MAIN
FA FIRE ALARM
SAN SANITATION
MH MANHOLE
POTW PUBLIC OPERATION TREATMENT WORKS
T TELEPHONE
POST INDICATOR VALVE
STREETLAMP
WALKLAMP
FIRE HYDRANT
JUNCTION BOX
GENERAL NOTES
1. ROUTE OF GAS LINE IS APPROXIMATE.
2. DATA ON THIS DWG. COLLECTED FROM SIEMEN'S DWG. SU-1 AND NUMEROUS OLIN DWGS. FOR THIS PROJECT. IT IS ACCURATE ONLY AS MUCH AS ARE THESE SORCE DWGS.
> Flow Direction

ATTACHMENT 5

EPA-New England RCRA Corrective Action Ecological Receptor Exposure Pathway Scoping Checklist

REVISED – MARCH 2008

EPA – New England
Resource Conservation and Recovery Act (RCRA) Corrective Action
Ecological Receptor Exposure Pathway Scoping Checklist

Facility Name: _____
Facility Address: _____
_____
Facility EPA ID #: _____

Purpose:

This checklist is designed as a screening tool to help EPA-New England (EPA-NE) RCRA Corrective Action project managers determine whether there is the potential for complete exposure pathways between RCRA facility contaminants and ecological receptors (i.e., plants and wildlife).

Intended Use:

EPA-NE has recognized a need for a tool to guide its review of facility information pertaining to ecological risk assessment. This checklist is intended to guide EPA-NE review of available information on environmental conditions at a facility to determine whether further ecological assessment is necessary. Ideally, the checklist should be completed early in the RCRA Corrective Action process. If complete ecological exposure pathways are identified, an EPA or state ecological risk assessor should be involved in planning subsequent site investigation and ecological risk assessment.

Some state environmental agencies in New England have developed, or are in the process of developing, their own checklists or other tools for scoping ecological exposure pathways. Although EPA-NE believes the use of this checklist may be comparable and complimentary to other existing scoping tools used by states, the format and content of this EPA-NE checklist may differ from such state tools. Accordingly, this checklist is designed primarily for use by EPA-NE RCRA Facility Managers and their agents.

The checklist is considered a public document and, once completed for a given facility, may be included in the facility file. As a public document, the checklist may be shared with states, the regulated community, or the public for informational purposes.

Instructions:

All available relevant/significant information on known and reasonably suspected contaminant releases at or from the facility to soil, groundwater, surface water/sediments should be considered in completing this checklist.

Each page of the checklist includes a series of questions to be answered by the project manager completing the checklist. In the "rationale and reference" section on each page, the project manager should summarize the supporting information used to answer the

questions and clearly reference the document, as well as the page number, table number or figure number, where the supporting data can be found. Rationale and references should be clear and specific so that the findings of the checklist are transparent and able to be reproduced. Based on the answers to the questions on each page, the project manager can complete the "Preliminary Ecological Risk Evaluation" section of the checklist.

If the answer to any of the questions in the Preliminary Ecological Risk Evaluation section is "yes", the project manager should consult a U.S. Environmental Protection Agency (EPA) or state ecological risk assessor for further information. In this case, an ecological risk assessor should be involved as early as possible in planning the site investigation and further ecological risk assessment. If the answer is "no" to all three findings in the Preliminary Ecological Risk Evaluation section, complete pathways for contaminant exposure to ecological receptors are not reasonably expected at the facility, based on the data used in completing the checklist. Following its completion, the checklist should be included in the facility file to document the rationale for consulting an ecological risk assessor and focusing any subsequent ecological risk assessment, or the rationale for not proceeding further with ecological risk assessment.

Note. Please be advised that new data or new information could alter the findings of this checklist. The checklist should be revisited if new information that might change the checklist findings becomes available. **Completion of this checklist is not intended to substitute for a Screening Level Ecological Risk Assessment (SLERA) or a Baseline Ecological Risk Assessment (BERA). Findings, documented by this checklist that ecological exposure to facility contaminants is not expected, are not considered final until a site-wide remedy decision made by EPA or a state environmental agency authorized for RCRA Corrective Action results in the termination of interim status of a facility or satisfaction with the conditions of a hazardous waste operating or post-closure permit**

REVIEW OF FACILITY INFORMATION & CONCEPTUAL SITE MODEL

In order for ecological risks to exist there must be a potential for exposure of ecological receptors to contaminants. This portion of the evaluation is designed to assist in the identification of contaminated environmental media associated with a site.

Based on a review of the file and an understanding of the conceptual site model for the facility, please identify the environmental media present on or adjacent to the facility property which are known or reasonably expected to be impacted by contaminants from the facility. Place a check mark next to the media type. Additionally, please evaluate the potential for migration of contaminants from the site. Potential migration pathways include surface water flow, run off, groundwater flow, erosion, placement of fill and discharge locations. Please attach a figure of the site showing areas of potential contamination.

Media Potentially Affected by Facility Operations:	**Potential for Migration**	**Migration Pathways**
_____ Soil	Yes__/No__	_____
_____ Sediment	Yes__/No__	_____
_____ Surface Water	Yes__/No__	_____
_____ Ground Water	Yes__/No__	_____

Rationale and References: (Please clearly reference the document name and date as well as the page, table or figure number where any data considered in answering the above questions can be found)

HABITAT DOCUMENTATION

In order for ecological risks to exist there must be a potential for ecological receptors to come into contact with contaminated media. This portion of the evaluation is designed to assist in the identification of potential presence of environmental receptors associated with a site. It is predicated upon the assumption that if suitable habitat exists, then ecological receptors could potentially be present.

Please check the potentially impacted habitats present on, adjacent to, or immediately downgradient of the facility based on a site visit and an understanding of the site conceptual model. Also, indicate for each habitat whether the presence of site-derived contamination has been confirmed, is suspected, is not expected, or is unknown

Table 1: Summary of habitats and presence of Site-derived contamination

Habitat type	Location			Presence of Site-derived contamination			
	At the site[a]	Adjacent to the site[b]	Not present	Con-firmed	Sus-pected	Not expected	Unknown
MARINE/ESTUARINE ENVIRONMENTS							
Salt marsh							
Tidal rivers & streams							
Exposed mudflats							
Seagrass beds							
Rocky shoreline							
Other[*]							
FRESHWATER ENVIRONMENTS							
Wetlands							
Lakes & ponds							
Rivers and streams							
Vernal pools[c]							
Other[*]							
TERRESTRIAL ENVIRONMENTS							
Wooded							
Transitional							
Open field							
Other[*]							

[a] "at the site" is defined as within the limits of the site perimeter or site fence

[b] "adjacent to the site" is more loosely defined as terrestrial or aquatic habitat present in the immediate vicinity of the site

[c] "vernal pool" refers to a temporary body of standing water often located in terrestrial habitat which appears in early spring but completely dries out by late spring-early summer. This type of habitat can be suitable and is critical for, among other things, amphibian reproduction.

[*] provide additional details

Habitat Documentation Rationale and References: (Please clearly reference the

document name and date as well as the page, table or figure number where any data considered in answering the above questions can be found.)

EXPOSURE ASSESSMENT

In order for there to be a potential for ecological risks to occur at a site, there must be a potential for stressors, in this case chemicals, to be present where ecological receptors could come in contact with them. After reviewing the previous pages on Facility Information and Habitat Documentation, plus additional facility information as necessary, please answer the following questions in order to determine if ecological receptors are known or could reasonably be expected to be exposed to contaminants at or from the facility. **If any contaminant concentration data showing non-detect results are used to conclude that an environmental medium is not contaminated, please consult an ecological risk assessor to confirm that analytical methods used were adequate to detect contaminants at concentrations below levels of concern for ecological receptors. In addition, contaminants that have the potential to bioaccumulate cannot be eliminated from further consideration through the use of this checklist. Bioaccumulating contaminants must be carried through the ecological risk assessment.**

Surface Water Bodies

Sediments

1 a. Is sediment in surface water bodies known or reasonably expected to be contaminated due to releases at or from the facility? Releases from a facility may include but are not limited to: point source discharges, run-off from contaminated soil, groundwater migration, erosion, filling or aerial deposition resulting from air emissions. **Note: If sediment samples are taken adjacent to or downstream of the site, collection should take place in depositional areas present.**

Yes__ (Complete the remaining questions in this checklist and circle "Yes" in Surface Water Body Finding under the PRELIMINARY ECOLOGICAL RISK EVALUATION Section below.)

No__ (Proceed to question 1b.)

Surface Water

1b. Is surface water known or reasonably expected to be contaminated due to releases at or from the facility? Releases from a facility may include but are not limited to: point source discharges, run-off from contaminated soil, discharge of contaminated groundwater, groundwater migration or aerial deposition resulting from air emissions. (Note: for surface water, dissolved metal data, from analysis of filtered water samples, is a better indicator of exposure than total metal data).

Yes__ (Complete the remaining questions in this checklist and circle "Yes" in Surface Water Body Finding under the PRELIMINARY ECOLOGICAL RISK EVALUATION Section below.)

No__ (Proceed to question 1c.)

Groundwater

1 c. For groundwater discharging to surface water, is groundwater, at the point of discharge to the surface water body, known or reasonably suspected to be contaminated

due to releases at or from the facility? Note: Because of the ability of certain sediments to accumulate contaminants, the need for sediment sampling in a water body should not be ruled out based on concentrations of suspected site related contaminants found to be below ecologically based ambient surface water quality criteria in groundwater which intersects surface water bodies.

Yes__ (Complete the Surface Water Bodies Rationale and References section and the remaining questions in this checklist. Then, circle "Yes" in the Surface Water Body Finding under the PRELIMINARY ECOLOGICAL RISK EVALUATION Section below.)

No__ (Complete the Surface Water Bodies Rationale and References section directly below, then proceed to the Surface Soil Section below.)

Surface Water Bodies Rationale and References: (Please attach additional pages as necessary to summarize the rationale for the answers provided in the "Surface Water Bodies" section above. Please clearly reference the document name and date as well as the page, table or figure number where any data considered in answering the above questions can be found. In addition, please discuss any site specific information, not specifically prompted by the question(s) above, that would help to clarify and/or qualify the finding.)

Surface Soil

2 a. Is surface soil (found at depths of 2 feet or less from the surface) known or reasonably expected to be contaminated due to releases at or from the facility?

Yes__ (Proceed to question 2 b.)
No__ (Complete the Surface Soil Rationale and References section and the remaining questions in this checklist, then circle "No" under Surface Soil Finding in the PRELIMINARY ECOLOGICAL RISK EVALUATION Section below.)

2 b. Is all contaminated surface soil covered with buildings, pavement or other physical barriers that prevent plants or wildlife from being exposed to contaminants and that prevent migration of soil contamination into groundwater that could affect a surface water body?

Yes__ (Proceed to question 2 c.)
No__ (Complete the Surface Soil Rationale and References section below and the remaining questions in this checklist, then circle "Yes" under Surface Soil Finding in the PRELIMINARY ECOLOGICAL RISK EVALUATION Section below.)

2 c. Is an institutional control in place to ensure the maintenance of the barriers described above so that receptors will not be exposed to contaminated soil (i.e., ensuring that soil will not be exposed as a result of excavation, demolition or other activities and that pavement or other physical barriers will be maintained in good condition and that if soil is exposed, appropriate measures will be taken to address any ecological risks).

Yes__ (After completing the Surface Soil Rationale and References section below and the remaining questions in this checklist, circle "No" under Surface Soil Finding in the PRELIMINARY ECOLOGICAL RISK EVALUATION Section below.)
No__ (After completing the Surface Soil Rationale and References section below, and the remaining questions in this checklist, circle "Yes" under Surface Soil Finding in the PRELIMINARY ECOLOGICAL RISK EVALUATION Section below.)

Surface Soil Rationale and References: (Please attach additional pages, as necessary, summarizing the rationale for the answers above. Please clearly reference the document name and date as well as the page, table or figure number where any data considered in answering the above questions can be found. In addition, please discuss any site specific information, not specifically prompted by the question(s) above, that would help to clarify and/or qualify the finding.)

Subsurface Soil

3 a. Is subsurface soil (found at depths greater than 2 feet from the surface) known or reasonably expected to be contaminated due to releases at or from the facility?

Yes__ (Proceed to question 3 b.)
No__ (Skip to the Subsurface Soil Rationale and References section. Then complete the remaining questions in this checklist and circle "No" under Subsurface Soil Finding in the PRELIMINARY ECOLOGICAL RISK EVALUATION Section below.)

3 b. Are the contaminated subsurface soils located in a setting where they could be exposed by erosion or that subsurface soil contaminants could be mobilized and transported via groundwater to a surface water body?

Yes__ (After completing the Subsurface Soil Rationale and References Section and the remaining questions in this checklist, circle "Yes" under Subsurface Soil Finding under the PRELIMINARY ECOLOGICAL RISK EVALUATION Section below).
No __ engineering controls are in place. (Proceed to question 3c)

3 c. Is an institutional control in place to effectively ensure that contaminated soil will not be brought to the surface, as a result of excavation, demolition or other activities and, if applicable, to ensure that engineering controls are maintained and that if contaminated soil is exposed, appropriate measures will be taken to address ecological risk?

Yes__ (After completing the Subsurface Soil Rationale and References Section and the remaining questions in this checklist, circle "No" under Subsurface Soil Finding under the PRELIMINARY ECOLOGICAL RISK EVALUATION Section below.)
No__ (After completing the Subsurface Soil Rationale and References Section and the remaining questions in this checklist, circle "Yes" under Subsurface Soil Finding under the PRELIMINARY ECOLOGICAL RISK EVALUATION Section below.)

Subsurface Soil Rationale and References: (Please attach additional pages, as necessary, summarizing the rationale for the answers above. Please clearly reference the document name and date as well as the page, table or figure number where any data considered in answering the above questions can be found. In addition, please discuss any site specific information, not specifically prompted by the question(s) above, that would help to clarify and/or qualify the finding.)

PRELIMINARY ECOLOGICAL RISK EVALUATION

Surface Water Body Finding:
Based on the information provided above, is further evaluation of risks to ecological receptors from contaminants in surface water or sediments of surface water bodies necessary?

Yes__ (Check "Yes" if the response to <u>any</u> of the questions above regarding Surface Water Bodies is "Yes")

No__ (Check "No" if the response to <u>all</u> of the questions above (1a, 1b, and 1c) regarding Surface Water Bodies is "No")

<u>Surface Soil Finding</u>:
Based on the information provided above, is further evaluation of risks to ecological receptors from contaminants in surface soil necessary?

Yes __

No__

<u>Subsurface Soil Finding</u>: Based on the information provided above, is further evaluation of risks to ecological receptors from contaminants in subsurface soil necessary?

Yes__

No__

Based on the information provided on the preceding pages, check the appropriate response:

_____ The answer was "No" for all three of the findings in this checklist (i.e., the Surface Water Body Finding, the Surface Soil Finding and the Subsurface Soil Finding). Therefore, based on the data considered in this checklist, ecological exposure to contaminants at or from the _____ _____facility , EPA ID # _____ , located at (street address)_____in (town and state) is not reasonably expected and further ecological risk assessment does not appear necessary.

Note: **Releases from the facility must be adequately characterized, in accordance with EPA guidance, in order to make this determination. This checklist should be revisited if new information, that would alter the checklist findings, becomes available. In addition, the finding that ecological exposure to facility contaminants is not expected is not considered final until a site-wide remedy decision made by EPA or a state environmental agency authorized for RCRA Corrective Action results in the termination of interim status of a facility or satisfaction with the conditions of a hazardous waste operating or post-closure permit.**

_____ The answer was "Yes" for any of the findings in this checklist (i.e., the Surface Water Body Finding, the Surface Soil Finding and the Subsurface Soil Finding). Therefore, further evaluation of ecological risk is recommended for the _____ facility, EPA ID #_____, located at (street address) _____ in (town and state)_____.

An EPA or state ecological risk assessor should be involved as early as possible in planning the facility investigation. This checklist can be provided to the ecological risk assessor to focus the ecological risk assessment on the potential exposure pathways.

Completed by: (signature)_____
Date _____
(printed name)_____
(title)_____

Locations where References may be found:

_____
_____
_____
_____